

## PATENT COOPERATION TREATY

## PCT

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty) 03 FEB 2005

(PCT Article 36 and Rule 70)

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Applicant's or agent's file reference RSJ07812WO	<b>FOR FURTHER ACTION</b>	
See Form PCT/IPEA/416		
International application No. PCT/GB2004/000875	International filing date (day/month/year) 02.03.2004	Priority date (day/month/year) 12.03.2003
International Patent Classification (IPC) or national classification and IPC B65H7/12		
Applicant DE LA RUE INTERNATIONAL LIMITED		
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 7 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input type="checkbox"/> <i>(sent to the applicant and to the International Bureau) a total of sheets, as follows:</i></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</li> <li><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</li> </ul> <p>b. <input type="checkbox"/> <i>(sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</i></p>		
<p>4. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Box No. I Basis of the opinion</li> <li><input type="checkbox"/> Box No. II Priority</li> <li><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</li> <li><input type="checkbox"/> Box No. IV Lack of unity of invention</li> <li><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</li> <li><input type="checkbox"/> Box No. VI Certain documents cited</li> <li><input type="checkbox"/> Box No. VII Certain defects in the international application</li> <li><input type="checkbox"/> Box No. VIII Certain observations on the International application</li> </ul>		
Date of submission of the demand 27.07.2004	Date of completion of this report 04.02.2005	
Name and mailing address of the international preliminary examining authority:   European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer  Lemmen, R Telephone No. +31 70 340-4112	

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## Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
  - This report is based on translations from the original language into the following language, which is the language of a translation furnished for the purposes of:
    - international search (under Rules 12.3 and 23.1(b))
    - publication of the international application (under Rule 12.4)
    - international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements\*** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

### Description, Pages

1-18 as originally filed

### Claims, Numbers

1-14 as originally filed

### Drawings, Sheets

1/3-3/3 as originally filed

- a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

- The amendments have resulted in the cancellation of:
  - the description, pages
  - the claims, Nos.
  - the drawings, sheets/figs
  - the sequence listing (*specify*):
  - any table(s) related to sequence listing (*specify*):
- This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
  - the description, pages
  - the claims, Nos.
  - the drawings, sheets/figs
  - the sequence listing (*specify*):
  - any table(s) related to sequence listing (*specify*):

\* If item 4 applies, some or all of these sheets may be marked "superseded."

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**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Yes:	Claims	1-14
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-14
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-14
	No:	Claims	

**2. Citations and explanations (Rule 70.7):**

**see separate sheet**

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**Re Item V.**

- 1 The following documents are referred to in this communication:  
D1 : US 6 101 266 A (MA SONGTAO ET AL) 8 August 2000 (2000-08-08)
- 2 **Independent Claim 1**
- 2.1 In claim 1 the term "said points" is unclear (Article 6 PCT) because the feature "points" has not been defined before, thereby rendering the definition of the subject-matter of said claim 1 unclear, Article 6 PCT. Furthermore, it is not clear from the wording of claim 1 how "said points" is related to the "regions".

In Item V, Claim 1 has therefore been interpreted according to page 14, lines 9-11:

Method for optically detecting a double feed in an apparatus for processing one or more types of sheet-like objects, particularly banknotes, characterised in that said sheet-like objects are illuminated, a transmission image of a specific sheet-like object of said sheet-like objects is produced by measuring transmission intensities of light transmitted through regions transmissive sampling points of said specific object and a reflection image is produced by measuring reflection intensities of light reflected from the said regions reflective sampling points of said specific object wherein the transmissive and the reflective sampling points represent corresponding portions of said specific object where said double feed is detected by applying a two-dimensional evaluation method, a first dimension of said two-dimensional evaluation method being formed by said transmission intensities and a second dimension of said two-dimensional evaluation method being formed by said reflection intensities, and wherein the two-dimensional evaluation method further comprises determining the location of said points in said two dimensions, and comparing said locations with a linear decision boundary.

- 2.2 Document D1, which is considered to represent the most relevant state of the art, discloses (the references in parenthesis applying to this document) a:

Method for optically detecting a double feed in an apparatus for processing one or more types of sheet-like objects, particularly banknotes (30), wherein said sheet-like objects (30) are illuminated (LED), a transmission image of a specific sheet-

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like object of said sheet-like objects is produced by measuring transmission intensities of light transmitted through regions transmissive sampling points of said specific object (22) and a reflection image is produced by measuring reflection intensities of light reflected from the said regions reflective sampling points of said specific object (20) wherein the transmissive and the reflective sampling points (Sample Date X,Y) represent corresponding portions of said specific object

- 2.3 From this, the subject-matter of independent claim 1 differs in that:

said double feed is detected by applying a two-dimensional evaluation method, a first dimension of said two-dimensional evaluation method being formed by said transmission intensities and a second dimension of said two-dimensional evaluation method being formed by said reflection intensities, and wherein the two-dimensional evaluation method further comprises determining the location of said points in said two dimensions, and comparing said locations with a linear decision boundary.

The subject-matter of claim 1 is therefore novel (Article 33(2) PCT)

- 2.4 The problem to be solved by the present invention may be regarded as:

To create a method for optically detecting a double feed of sheet-like objects that yields more reliable results in detecting a double feed, particularly a lower number of double notes that are accepted as single notes and a lower number of single notes that are wrongly rejected as doubles.

The solution to this problem proposed by the features (point 2.3) of claim 1 of the present application is neither known from, nor rendered obvious by, the available prior art and therefore considered as involving an inventive step (Article 33(3) PCT).

**3 Dependent Claims 2-8**

Claims 2-8 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

**4 Independent Claim 9**

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- 4.1 In claim 9 the term "said points" is unclear (Article 6 PCT) because the feature "points" has not been defined before, thereby rendering the definition of the subject-matter of said claim 9 unclear, Article 6 PCT.

In Item V, Claim 9 has therefore been interpreted according to page 14, lines 9-11:

Apparatus for processing one or more types of sheetlike objects, particularly banknotes, having transport means for conveying said sheet-like objects along a transport path in a moving direction and a detector for an optical detection of a double feed of said objects, said detector comprising illumination means for illumination of said sheet-like objects, particularly with infra-red light, a transmission-type sensor for producing a transmission image of said objects by measuring transmission intensities of light transmitted through transmissive sampling points of said objects, a reflection-type sensor for producing a reflection image of said objects by measuring reflection intensities of light reflected from reflective sampling points of said specific object wherein the transmissive and the reflective sampling points represent corresponding portions of said specific object and an evaluator which is built such that a two-dimensional evaluation can be carried out where a first dimension is formed by said transmission intensities and a second dimension is formed by said reflection intensities, the evaluator being adapted to carry out the steps of determining the location of said points in said two dimensions, and comparing said locations with a linear decision boundary.

- 4.2 Document D1, which is considered to represent the most relevant state of the art, discloses (the references in parenthesis applying to this document) an:

Apparatus for processing one or more types of sheetlike objects, particularly banknotes, having transport means (12) for conveying said sheet-like objects (30) along a transport path in a moving direction and a detector (20,22) for an optical detection of a double feed of said objects, said detector comprising illumination means (LEDs) for illumination of said sheet-like objects, particularly with infra-red light, a transmission-type sensor (22) for producing a transmission image of said objects by measuring transmission intensities of light transmitted through transmissive sampling points of said objects, a reflection-type sensor (20) for producing a reflection image of said objects by measuring reflection intensities of light reflected from reflective sampling points of said specific object wherein the

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transmissive and the reflective sampling points represent corresponding portions  
of said specific object

**4.3 From this, the subject-matter of independent claim 9 differs in:**

an evaluator which is built such that a two-dimensional evaluation can be carried out where a first dimension is formed by said transmission intensities and a second dimension is formed by said reflection intensities, the evaluator being adapted to carry out the steps of determining the location of said points in said two dimensions, and comparing said locations with a linear decision boundary.

The subject-matter of claim 9 is therefore novel (Article 33(2) PCT)

**4.4 The problem to be solved by the present invention may be regarded as:**

To create an apparatus for optically detecting a double feed of sheet-like objects that yields more reliable results in detecting a double feed, particularly a lower number of double notes that are accepted as single notes and a lower number of single notes that are wrongly rejected as doubles.

The solution to this problem proposed by the features (point 4.3) of claim 9 of the present application is neither known from, nor rendered obvious by, the available prior art and therefore considered as involving an inventive step (Article 33(3) PCT).

**5 Dependent Claims 10-14**

Claims 10-14 are dependent on claim 9 and as such also meet the requirements of the PCT with respect to novelty and inventive step.